

Amendments to the Claims:

Claims 1-135 (Cancelled)

136. (Currently Amended) ~~The copolymer of claim 126,~~An intrinsically conductive copolymer, the copolymer having a conductivity ranging from  $10^{-8}$  S/cm to 300 S/cm, wherein the copolymer is a polyurethane copolymer.

Claims 137-139 (Cancelled)

140. (Currently Amended) ~~The copolymer of claim 126,~~An intrinsically conductive copolymer, the copolymer having a conductivity ranging from  $10^{-8}$  S/cm to 300 S/cm, wherein the copolymer includes a structural polymer comprising an ATRP-polymerizable segment.

141. (Cancelled)

142. (Previously Presented) An intrinsically conductive copolymer, the copolymer having a conductivity ranging from  $10^{-8}$  S/cm to 300 S/cm, wherein the copolymer has at least one intrinsically conducting polymer segment, the copolymer including a structural polymer comprising an ATRP-polymerizable segment.

143. (Previously Presented) The copolymer of claim 142, wherein the copolymer has at least one conducting segment selected from the group consisting of polythiophene, polypyrrole, poly-*p*-phenylenevinylene, and polyaniline, the copolymer including a structural polymer selected from the group consisting of a polystyrene, a polyacrylate, and a polyurethane.

144. (Previously Presented) The copolymer of claim 142, wherein the conductivity ranges from  $10^{-8}$  S/cm to 150 S/cm.

145. (Previously Presented) The copolymer of claim 142, wherein the conductivity ranges from  $10^{-5}$  S/cm to 300 S/cm.

146. (Previously Presented) The copolymer of claim 142, wherein the conductivity ranges from  $10^{-5}$  S/cm to 150 S/cm.

147. (Previously Presented) The copolymer of claim 142, wherein the conductivity ranges from  $10^{-2}$  S/cm to 150 S/cm

148. ((Previously Presented) The copolymer of claim 142, wherein the conductivity ranges from 1 S/cm to 150 S/cm.

149. (Previously Presented) The copolymer of claim 142, wherein the conductivity ranges from 5 S/cm to 150 S/cm.

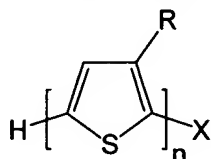
150. (Previously Presented) The copolymer of claim 142, wherein the conductivity ranges from 10 S/cm to 150 S/cm.

151. (Previously Presented) The copolymer of claim 142, wherein the copolymer is a diblock copolymer.

152. (Previously Presented) The copolymer of claim 142, wherein the copolymer is a triblock copolymer.

153. (Previously Presented) The copolymer of claim 142, wherein the copolymer is a polyurethane copolymer.

154. (Previously Presented) An intrinsically conductive polythiophene copolymer, the copolymer having a conductivity ranging from  $10^{-8}$  S/cm to 300 S/cm, wherein the copolymer is formed from the polymer having the structure:



wherein R is a substituent selected from the group consisting of alkyl, polyether, and aryl, X is a halogen, and n is greater than 1,

the polymer being formed from a polymerization reaction in major amounts of at least 90% by weight.

155. (Previously Presented) The copolymer of claim 154, wherein the conductivity ranges from  $10^{-8}$  S/cm to 150 S/cm.

156. (Previously Presented) The copolymer of claim 154, wherein the conductivity ranges from  $10^{-5}$  S/cm to 300 S/cm.

157. (Previously Presented) The copolymer of claim 154, wherein the conductivity ranges from  $10^{-5}$  S/cm to 150 S/cm.

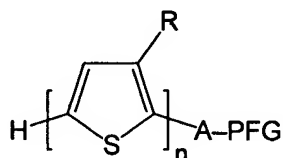
158. (Previously Presented) The copolymer of claim 154, wherein the conductivity ranges from  $10^{-2}$  S/cm to 150 S/cm

159. (Previously Presented) The copolymer of claim 154, wherein the conductivity ranges from 1 S/cm to 150 S/cm.

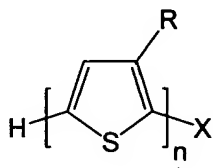
160. (Previously Presented) The copolymer of claim 154, wherein the conductivity ranges from 5 S/cm to 150 S/cm.

161. (Previously Presented) The copolymer of claim 154, wherein the conductivity ranges from 10 S/cm to 150 S/cm.

162. (Currently Amended) An intrinsically conductive polythiophene copolymer, the copolymer having a conductivity ranging from  $10^{-8}$  S/cm to 300 S/cm, wherein the copolymer is formed from the protected thiophene polymer having the structure:



wherein PFG is a protected hydroxyl or amine functional group, and A is selected from the group consisting of alkyl and aromatic, the protected thiophene polymer formed from ~~the polymer of claim 1~~ a polythiophene polymer, the polymer having the structure:



wherein R is a substituent selected from the group consisting of alkyl, polyether, and aryl, X is a halogen, and n is greater than 1, the polymer being formed from a polymerization reaction in major amounts of at least 90% by weight.

163. (Previously Presented) The copolymer of claim 162, wherein the conductivity ranges from  $10^{-8}$  S/cm to 150 S/cm.

164. (Previously Presented) The copolymer of claim 162, wherein the conductivity ranges from  $10^{-5}$  S/cm to 300 S/cm.

165. (Previously Presented) The copolymer of claim 162, wherein the conductivity ranges from  $10^{-5}$  S/cm to 150 S/cm.

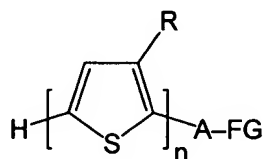
166. (Previously Presented) The copolymer of claim 162, wherein the conductivity ranges from  $10^{-2}$  S/cm to 150 S/cm

167. (Previously Presented) The copolymer of claim 162, wherein the conductivity ranges from 1 S/cm to 150 S/cm.

168. (Previously Presented) The copolymer of claim 162, wherein the conductivity ranges from 5 S/cm to 150 S/cm.

169. (Previously Presented) The copolymer of claim 162, wherein the conductivity ranges from 10 S/cm to 150 S/cm.

170. (Previously Presented) An intrinsically conductive polythiophene copolymer, the copolymer having a conductivity ranging from  $10^{-8}$  S/cm to 300 S/cm, wherein the copolymer is formed from the polymer having the structure:



wherein R is selected from the group consisting of alkyl, polyether, and aryl; n is greater than 1; A is selected from the group consisting of alkyl and aromatic, and FG is a functional group selected from the group consisting of primary alkyl amine and primary alcohol,

171. (Previously Presented) The copolymer of claim 170, wherein the conductivity ranges from  $10^{-8}$  S/cm to 150 S/cm.

172. (Previously Presented) The copolymer of claim 170, wherein the conductivity ranges from  $10^{-5}$  S/cm to 300 S/cm.

173. (Previously Presented) The copolymer of claim 170, wherein the conductivity ranges from  $10^{-5}$  S/cm to 150 S/cm.

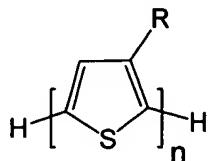
174. (Previously Presented) The copolymer of claim 170, wherein the conductivity ranges from  $10^{-2}$  S/cm to 150 S/cm

175. (Previously Presented) The copolymer of claim 170, wherein the conductivity ranges from 1 S/cm to 150 S/cm.

176. (Previously Presented) The copolymer of claim 170, wherein the conductivity ranges from 5 S/cm to 150 S/cm.

177. (Previously Presented) The copolymer of claim 170, wherein the conductivity ranges from 10 S/cm to 150 S/cm.

178. (Previously Presented) An intrinsically conductive polythiophene copolymer, the copolymer having a conductivity ranging from  $10^{-8}$  S/cm to 300 S/cm, wherein the copolymer is formed from the polymer having the structure:



wherein R is a substituent selected from the group consisting of alkyl, polyether, and aryl, and n is greater than 1,

the polymer being formed from a polymerization reaction in major amounts of at least 90% by weight.

179. (Previously Presented) The copolymer of claim 178, wherein the conductivity ranges from  $10^{-8}$  S/cm to 150 S/cm.

180. (Previously Presented) The copolymer of claim 178, wherein the conductivity ranges from  $10^{-5}$  S/cm to 300 S/cm.

181. (Previously Presented) The copolymer of claim 178, wherein the conductivity ranges from  $10^{-5}$  S/cm to 150 S/cm.

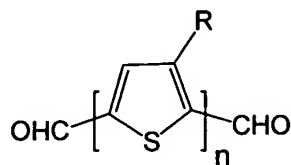
182. (Previously Presented) The copolymer of claim 178, wherein the conductivity ranges from  $10^{-2}$  S/cm to 150 S/cm

183. (Previously Presented) The copolymer of claim 178, wherein the conductivity ranges from 1 S/cm to 150 S/cm.

184. (Previously Presented) The copolymer of claim 178, wherein the conductivity ranges from 5 S/cm to 150 S/cm.

185. (Previously Presented) The copolymer of claim 178, wherein the conductivity ranges from 10 S/cm to 150 S/cm.

186. (Currently Amended) An intrinsically conductive polythiophene copolymer, the copolymer having a conductivity ranging from  $10^{-8}$  S/cm to ~~450~~ 300 S/cm, wherein the copolymer is formed from the polymer having the structure:



wherein R is a substituent selected from the group consisting of alkyl, polyether, and aryl, and n is greater than 1.

187. (Previously Presented) The copolymer of claim 186, wherein the conductivity ranges from  $10^{-8}$  S/cm to 150 S/cm.

188. (Previously Presented) The copolymer of claim 186, wherein the conductivity ranges from  $10^{-5}$  S/cm to 300 S/cm.

189. (Previously Presented) The copolymer of claim 186, wherein the conductivity ranges from  $10^{-5}$  S/cm to 150 S/cm.

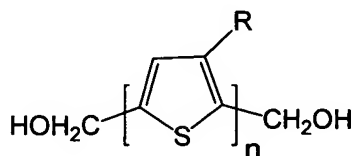
190. (Previously Presented) The copolymer of claim 186, wherein the conductivity ranges from  $10^{-2}$  S/cm to 150 S/cm

191. (Previously Presented) The copolymer of claim 186, wherein the conductivity ranges from 1 S/cm to 150 S/cm.

192. (Previously Presented) The copolymer of claim 186, wherein the conductivity ranges from 5 S/cm to 150 S/cm.

193. (Previously Presented) The copolymer of claim 186, wherein the conductivity ranges from 10 S/cm to 150 S/cm.

194. (Previously Presented) An intrinsically conductive copolymer, the copolymer having a conductivity ranging from  $10^{-8}$  S/cm to 300 S/cm, wherein the copolymer is formed from a poly-(3-substituted) thiophene diol having the structure:



wherein R is a substituent selected from the group consisting of alkyl, polyether, and aryl, and n is greater than 1.



195. (Previously Presented) The copolymer of claim 194, wherein the conductivity ranges from  $10^{-8}$  S/cm to 150 S/cm.

196. (Previously Presented) The copolymer of claim 194, wherein the conductivity ranges from  $10^{-5}$  S/cm to 300 S/cm.

197. (Previously Presented) The copolymer of claim 194, wherein the conductivity ranges from  $10^{-5}$  S/cm to 150 S/cm.

198. (Previously Presented) The copolymer of claim 194, wherein the conductivity ranges from  $10^{-2}$  S/cm to 150 S/cm

199. (Previously Presented) The copolymer of claim 194, wherein the conductivity ranges from 1 S/cm to 150 S/cm.

200. (Previously Presented) The copolymer of claim 194, wherein the conductivity ranges from 5 S/cm to 150 S/cm.

201. (Previously Presented) The copolymer of claim 194, wherein the conductivity ranges from 10 S/cm to 150 S/cm.